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A N
Inaugural Dissertation,

ON THE
RATIONALE of the OPERATION
of OPIUM on the ANIMAL ECONOMY ;

WITH
Observations on its USE in DISEASE.

SUBMITTED

To the EXAMINATION of
The Reverend JOHN EWING, S. T. P. Provost;

THE
TRUSTEES and MEDICAL FACULTY
OF THE

UNIVERSITY OF PENNSYLVANIA,

ON THE MAY, 1797,
For the DEGREE of DOCTOR OF MEDICINE.

Nullius addictus, jurare in verba Majistri.

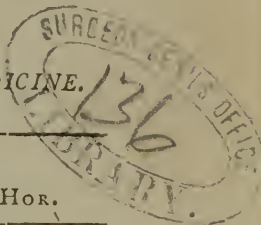
HOR.

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P R E F A C E.

'TIS true, there are some of narrow minds and grovelling conceptions, who consider every proposed innovation, as wild and chimerical; and look upon every attempt to depart from the beaten track, as the rash inconsiderate effort of a warm imagination, or the glittering speculation of a bewildered mind; that may please and dazzle for a time, but can produce no real, or permanent advantage.

THESE sceptics value themselves, upon believing nothing in contravention of the opinion of the times—upon inventing arguments against every new doctrine, and when arguments cannot be found, upon treating the adventurer with contempt and ridicule; such have been the most formidable opponents, to every great and useful discovery, for their principles and prejudices, tending to equalize all capacities and characters, cannot fail to infatuate the indolent, the envious and the timorous.

THE danger indeed of admitting great and important innovations, without the exactest scrutiny, cannot be too strongly inculcated, nor the views of those who are forward to promote them, without due examination, reprobated with too much severity. But is it not possible to run into the opposite extreme, and bring upon society the very evils, we wish to avert; by an obstinate opposition to those gradual and necessary reformations, which the genius of philosophy demands?

'Tis a negligent reverence for erroneous opinions, which have been sanctioned by time, accompanied with an inattention to the encreasing lights in science, that has so astonishingly retarded the progress of medicine.

No system of Physical education it must be confessed is so perfect, but that various prejudices may fasten upon the intellect, so as to acquire over it an influence, not inferior to the most incontrovertible truths; hence it is that much of the time of a Physician must of necessity be taken up, by correcting the errors he had been accustomed to give an implicit confidence; and unless he agree to submit the whole of his inquiries to free investigation, his hard-earned learning, instead of enlightening the world, will only give additional currency, and bestow additional authority, to established errors.

A N

INAUGURAL DISSERTATION.

NOTHING surely, deserves our serious consideration, more pre-eminently, in all the study of Medicine, than the operation of medical substances on the human body. True it is, we have been much misled by the speculative reasonings of learned men, anxious to elevate their characters, and amplify their emoluments; great, very great, are the injuries which humanity has sustained, by their erroneous opinions and absurd theories.

THE animal body may be divided into three general constituent parts, viz. the simple fibre, *solida viva*, and the circulating Mass. The first mentioned was by Dr. Boerhaave, and his disciples, considered as frequently disordered by excess of rigidity, and too great laxity, and that these preternatural states being casual, were alterable by medicine. The more modern physiologists however, at the same time that they acknowledge the possibility of a morbid condition therein, contend for its being a constitutional infirmity very little under the influence of remedies. The circulating fluids have also by Galen, and his numerous followers, been esteemed the residence of complaints:—These theorists talk much of acrimonious crudities, and other vitiated states of the fluids, with a seeming unconsciousness of the fallacy of their reasonings, or uncertainty of their inferences: not recollecting the material alterations which substances taken into the stomach, are subjected to, by the mysterious powers of digestion, nor are they more mindful of the vigilance with which the absorbents perform their duty, which standing as a faithful centinel, sternly refuse entrance to all articles inimical to the health of the system:

THAT the *solida viva* are the principal seat of disease, and the medium through which, medicine operates

their prevention and cure, 'tis humbly presumed, is sufficiently established by the celerity with which an opiate relieves the immediate effect of an astringent in the suppression of hemorrhages, the instant operation of æther in quieting the spasms of the system, and other analogous cases. Opium indeed is proven to have an immediate and direct operation on the nervous system by the experiments of Dr. Whyt, which shew the heart to be irritable after being separated from the human body, and to be thrown into contractions on the application of stimulants; and also to have its power of motion suspended, nay even destroyed by the application of opium. The same principle is daily evinced by the use of it topically, with a view of relieving local pain. 'Tis one of those substances which diminish the sensibility and irritability of the system, and thereby the motions and powers of motion in it; and is especially remarkable, for inducing that sensation of sense and motion, in which sleep consists. Altho' its operation is primarily on the nerves to which 'tis applied, 'tis very constantly at the same time imparted to other communicating nerves, more or less, according to the number and sensibility of the nerves to which 'tis in contact.

THE effect of opium on different parts, is varied by the habits of the system, with regard to it, by the degree of stimulus to which the parts are exposed, and lastly, *cæteris paribus*, by the strength or energy of the nervous influence prevailing therein. Thus the heart and lungs are less affected than other parts, and retain their motions entire, when others are destroyed, on account of the incessant stimuli by which they are instigated; hence also the reason why its effects are first discovered in the extremities, the nervous energy being there most weak, and *e contra*. What the precise alteration in the nervous system, which opium occasions during the continuance of its effects on them can be, is for some happier genius to explain.

WITH a view of discovering the nature of the quality by which opium effects its wonderful influence on our bodies, whether it be intrinsically stimulant or sedative, it becomes requisite to examine the phenomena which occur after the exhibition of an ordinary opiate.

LET it not be forgotten however, that our observations to the end that they may admit of conclusive inferences, should be accurately drawn from an observance of its effects on healthy bodies—the apparent effect of medical substances being diversified almost to infinity by the peculiarity of the morbid condition, as occurring in different diseases; thus we find in a retrocession of the gout the pulse often beating an hundred and forty times a minute, with extreme pain, anxiety and fever; administer a glass of Jamaica spirits, and the heat, fever, anxiety, restlessness and frequency of the pulse instead of being aggravated thereby, are uniformly moderated—The pulse is reduced to its natural and healthy standard—the feverish burning and anxiety disappear, and the patient not unfrequently regaled by a calm refreshing sleep. In this particular instance then, an undoubted stimulus appears to exert on the system a sedative influence; but paradoxical as it may seem, to those little accustomed to reason on the laws of the animal economy, it in truth, produces those tranquilizing effects, entirely by its stimulant virtue. May not opium then, be presumed in some instances, to deceive us by the appearance of exerting on the system a stimulant quality, by exciting all the powers of it, when in truth 'tis accomplished solely by a sedative influence.

LET such an instance, serve to deter us from the hateful practice of establishing primary and fundamental principles from extraordinary cases, or deducing general conclusions from particular, solitary facts, a loose, fallacious method of reasoning too often destructively indulged. For as in matters of religion, 'tis easy to support the most unorthodox, heretical opinions, by detached, partial, mutilated quotations of scripture, so in medicine, the most erroneous principles, or fanciful hypothesis, may be contended for, as resting on the sure, permanent basis of experience from the authority of pretended observations, or observations but lamely and partially made and *Quæd. nulla.*

THE phenomena which occur after the exhibition of an ordinary opiate, in the animal economy, are a fulness and softness of the pulse, serenity and composedness of mind, with an occasional turgescence of the blood-vessels, then succeed languor, lassitude, irritability and uneasiness, accompanied with a suppression of all the secretions, and excretions, the perspiratory

discharge excepted, I might add to the account of the effects of opium on the body, the cordial, exhilarating influence, it sometimes discovers on the mind.

FROM observing that its power is exerted primarily on the stomach, and from thence extended through the medium of communicating nerves, to the rest of the system invariably attended with a diminution of the respective evacuations, and that the alimentary tube is rendered insensible to a certain degree, the viscera urinaria disobedient to its irritating salts, and the gall bladder regardless of the stimulant acrimony of its contents, it may with some reason be presumed that 'tis of a sedative nature.

THAT rule of philosophizing which restrains the multiplication of causes to those which are true, and sufficient to explain the phenomena, certainly warrants the explication of the contrariety of effects which attend the use of medicine, upon a theory of as much simplicity as may be—the great architect of nature having with marked attention, avoided all unnecessary complication, in the whole of his works. Regarding therefore the suppression of evacuations, and diminution of sensibility which attend the use of opium, as testimony of the presence of a sedative quality, I would ascribe the fulness and softness of the pulse, to the like influence extended to the heart, which by weakening the force of its action, occasions an accumulation of blood in the larger vessels; which circumstance of accumulation arising from the weakened action of the heart, very satisfactorily explains the paleness, languor, and corrugation of the surface, which takes place on its use.

THAT law of the animal economy, which occasions the excitement of such motions as are best calculated to repel any offending matter, presents itself as a clew to the solution of the increased force and frequency of the pulse; as also of the occasional turgescence of the blood-vessels before spoken of. A parallel instance indeed, is to be found in the immense commotions, great heat, and febrile action, which are produced in our system by the sedative operation of marsh miasma, cold, fear, &c. This preserving power, is well known in the schools of medicine, under the title of the *vis mediatrix naturæ*; which though of different explanation, must as a general law, be admitted: Nor have I

any doubt, but that it may be fairly employed here, to account for the stimulant effects which so often appear on the exhibition of an opiate. These to be sure, are often evident and considerable, but do not imply any directly stimulant power in the medicine itself, as they can be so well explained in the manner mentioned—they being the combined result of the sedative operation of the opiate, and the resistance and consequent activity of the system, and not of any increase of excitement in the system itself, as occasioned by the operation of a direct and diffusive stimulus.

LET us not in this case presume a quality, to explain effects, which are perfectly consonant to the known laws of the animal economy upon the contrary supposition. Are we in our sober reasonings upon an important subject to wander into the regions of imagination? The license of conjecture, where error would be ruinous, is to be justified by the principles of morality and just rules of philosophizing, on no occasion.

THE consideration, that the strength of our bodies, depends principally upon the energy of the brain and nerves, precludes the idea of their being weakened by opium, if its effect was other than sedative; except indeed it be indirectly done. Is not the idea of its operating sedatively, more reconcileable to the phenomena which take place after its use, and more consonant to that simplicity, which nature so wisely preserves in all her operations, than the idea of its being a pure, most penetrating stimulus, which however plausible in itself, or specious in all appearance, in the conjured explanation of a fact, which the enthusiastic mind of its progenitor would willingly have denied?

THE cordial exhilarating influence, which it exerts on the mind, is produced by its composing the nervous commotions, and introducing sensations of an agreeable kind, which tend in the same manner with pleasant intelligence, or joy any how raised, to infuse new vigour and animation into the mind and spirits. This idea is greatly corroborated by the reflection that the passions which are the opposites to those produced by opium, as fear, grief, &c. have at all times been reckoned debilitating; and among the principal causes, of those asthenic diseases, in which opium is alledged to prove beneficial. Is it not apparent that in many of

those cases, the favourable change of the complaint, being occasioned by an elevation of the spirits, short in its duration, and transitory in its effects, without any extra alteration in that morbid condition of the habit which especially constitutes the disease, that it cannot be considered as an abatement thereof, or the smallest advance towards a perfect cure ?

THE turgid state of the vessels, which is alledged to have been noticed on the use of this article, is probably imputed to the debility of the heart and arterial system, and consequent accumulation of blood, in the large internal vessels ; and contend that any alteration which may have been observed in the state of the fluids, is produced by its efficacy in varying the action of the vessels. The smallness of the quantity in which 'tis usually given, and the quickness of the operation, preclude the possibility of its having penetrated the circulating mass, and militates in the strongest manner against its direct and immediate operation on the fluids.

THIS brings me to the consideration of its use in disease.

'Tis worthy of observation, that as in physiognomy, the human countenance, is varied almost to infinity, merely by a difference in the assemblage of features, so in medicine diseases admit of the greatest possible diversity, by an endless variation in their associated symptoms. Hence the impossibility of a practical distribution of them, into general classifications, as stenic and astenic, or phlogistic and anti-phlogistic. Hence also, the absurdity and indeed the impracticability of that simplification of the practice, which such a distribution is calculated to effect, viz. to prescribe stimulants, no matter of what species, provided they be agreeable, in all diseases of weakness, and refrigerents together with the anti-phlogistic regimen, in all disease of excessive excitement, without regarding either the peculiar modification of the disease, as arising from the complication of the symptoms, the characteristic morbid condition of the habit, in which the disorder consists, and by which 'tis distinguished from all others ; or the peculiar and specific properties of the individual medicine employed, by which 'tis enabled to perform effects, and operate cures, which no other articles could accomplish.

No one will deny that many diseases require a treatment peculiar to themselves—suited to the innate disposition of each particular disease ; and that their radical cure, is often to be effected, in no other way. As various medicines are known to possess virtues and qualities *sui generis*, as they may be styled, virtues peculiar to, and characteristic of themselves, so in many diseases, there is a peculiarity of morbid condition in the system, independent of the degree of excitement therein, which belongs to that special disease, and differs it from every other.

'Tis the happy adjustment of medicine, thus possessing peculiar and ascertained qualities and powers, to that precise and distinguished morbid condition of the habit, which from its specific virtues, 'tis the best calculated to remedy, that forms the practical duty of a physician : And 'tis a degree of excellence and adroitness, in the management of this nice and important business, which constitutes the man of practical eminence ; without which, was he possessed of the genius of a Newton, with the erudition of an Aristotle, he never could become happily skilled in the profession.

THOSE principles being established, I would, tho' with great deference, hazard an opinion, that the now fashionable medicine called opium, ought not to be relied on, as the ultimum the art of physic can do, in any case, except there be that inexpressible kind of aptitude, that happy fitness, corresponding with elective attraction in chemistry, subsisting between it, and the disorder, whereby it becomes the most eligible remedy. How small the number of diseases which opium is thus peculiarly suited to eradicate, in comparison with the vast number in which 'tis daily prescribed !

MAY not this consideration, serve to estimate the abuses of it in medicine ? To restrict the use of it absolutely, to those cases, which it is calculated radically to remedy, is not the object of these observations. The passion for it, as founded on the pleasant effects that result from its use, is a guarantee against any such event. To be minute and circumstantial in the direction of the diseases in which it may be properly administered, is incompatible with the nature of this work. As a general rule it may be stated as admissa-

ble, in all those cases where upon the deepest reflection, there cannot be developed the smallest repulsive force, the least repugnance, or unsuitableness subsisting between it, and the disorder. The latitude given with regard to its administration, is not intended to license the use of it, without accurately noticing its effect on the mind — thereby guarding with much caution the patient from that kind of dependance upon it, which so often proves fatal by generating a laxity in the use of other more efficacious means.

How many instances have we witnessed, of an entire diversion of the patient's attention, from the proper sources of relief, by the enchanting effects of opium? So unhappy a consequence, resulting from the exhibition of an article, thus potent and common, ought to have its proper operation on the minds of those, whose erudition and character, give weight to opinion and force to their example.

HABIT when established in its dominion, over the unreflecting and illiterate, is not to be eradicated but with the extremest difficulty. None of the many arguments which are to be adduced against the admission of those of evil tendency, are of more serious import, than the consideration of their extent, as to time, being utterly incalculable. In this view, latest posterity may have cause to lament the injuries sustained by the folly and indiscretion of the present generation. The influence of fashion is not more justly deplored, or extensively felt by any, than the votaries of medicine. So rapid and mighty is its torrent, that nothing, but the greatest aid which philosophy can afford, is adequate to its resistance. To estimate the possible harm of an evil habit, is not more the duty of the moralist and divine, than the enlightened physician.

I conclude with a hope, that if the theory here adopted, should not be cherished with general approbation, that it will be received as a pledge of equal freedom in all future enquiries; presuming that this circumstance will of itself, give a claim to a degree of regard. 'Tis from the diffusion and prevalence of a free spirit of enquiry, that we are to look for improvements in the healing art. May it not be said, that in this æra, so auspicious to the happiness of the American people, that medicine languishes, or becomes tardy, in her progress of improvement?

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